REMARKS

This application has been reviewed in light of the Office Action dated December 6, 2005. In view of the foregoing amendments and the following remarks, favorable reconsideration and withdrawal of the rejections set forth in the Office Action are respectfully requested.

The title of the invention has been changed to DETERMINING BOUNDARY LOCATION LIKELIHOODS FOR SPEECH AND BACKGROUND NOISE which is believed to be clearly indicative of the invention to which the claims are directed.

Claims 13-24, 37-48, 50, and 52 are pending. Claims 15 and 39 have been canceled, without prejudice or disclaimer of subject matter. Claims 13, 37, 50 and 52 have been amended to define still more clearly what Applicant regards as his invention, in terms which distinguish over the art of record. Support for the claim changes can be found in the original disclosure, and therefore no new matter has been added. Claims 13, 37, 50 and 52 are in independent form.

Claims 13, 18, 21, 37, 42, 45, 50 and 52 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,638,487 (*Chigier*). Claims 14, 15, 22, 38, 39 and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Chigier* in view of U.S. Patent No. 5,842,161 (*Cohrs et al.*). Claims 16, 17, 19, 20, 40, 41, 43 and 44 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Chigier* in view of U.S. Patent No. 4,956,865 (*Lennig et al.*). Claims 23 and 47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Chigier* in view of *Cohrs et al.* and further in view of the article "Bounds on $R_1(D)$ Functions for Speech Probability Models" (*Abut et al.*). Claims 24 and 48 were rejected under 35 U.S.C. § 103(a) as

being unpatentable over *Chigier* in view of *Cohrs et al.*, and further in view of U.S. Patent No. 5,778,342 (*Erell et al.*).

Independent Claims 13, 37, 50 and 52 as currently amended are directed to determining the location of a boundary between a speech containing portion and a background noise containing portion of an input speech signal in which an input signal is received. The received signal is processed to generate an energy signal indicative of the local energy within the received signal. A speech detector detects when speech is present in the received signal. The likelihood that the boundary is located at each of plural possible locations within the energy signal is determined and the boundary location is determined using the likelihood determinations. The likelihood determination operates to determine the likelihoods in the received signal when the speech detecting detects speech within the received signal.

In Applicant's view, *Chigier* discloses an automatic speech recognition scheme that recognizes speech represented by a sequence of frames of acoustic events separated by boundaries. The frames of speech are processed to assign to received frames respective boundary probabilities representative of the degree to which the frames of speech correspond to stored representations of boundaries between acoustic events. The assigned boundary probabilities are used in subsequent processing steps to enhance recognition of speech. The assignment of boundary probabilities and further adjustments of the assigned probabilities are preferably conducted by an artificial neural network.

In Applicant's opinion, *Cohrs et al.* discloses a speech recognition arrangement in which a recognition criterion or set of recognition criteria are updated automatically, over time, in accordance with the speech input of the user(s). Each input utterance is compared to one or

more models of speech to determine a similarity metric for each such comparison. A model of speech which most closely matches the utterance is determined based on the one or more similarity metrics. The similarity metric corresponding to the most closely matching model of speech is analyzed to determine whether the similarity metric satisfies the selected set of recognition criteria. The recognition criteria are automatically altered during use or "on-the-fly", so that more appropriate criteria (and associated thresholds) may be used to either increase the probability of recognition or decrease the incidence of false positive results. Illustratively, if a voice sample results in a near miss of a template, a more liberal criterion is thereafter employed to increase the probability of recognition for subsequent input. Parametric histories of recognition and near misses followed by recognition are kept with periodic alteration of the criteria values to correspond to these histories. Additionally, parametric histories of false alarms are maintained and used to update criteria values in combination with recognition histories.

According to the invention of Claims 13, 37, 50 and 52, when speech is present in the received signal is identified by a speech detector. The likelihood that a boundary is located at each of plural possible locations within an energy signal indicative of local energy in the received signal is determined for each possible location and the boundary location is determined using the likelihoods for each of the possible locations. The likelihood determinations of plural locations in the energy signal operates when the speech detector detects speech within the received signal.

Chigier may disclose a type of neural network based on a classifier that detects phoneme boundaries on the basis of probabilities. The boundary detection of *Chigier*, however, operates at all times to determine boundary locations as shown in Fig. 2 and 2A. The *Chigier* arrangement, however, is devoid of any suggestion of the feature of a speech detector that

identifies when speech is present in a received signal combined with the feature of determining of boundary location from likelihoods of plural possible locations in an energy signal that are formed when speech is detected in the received signal as in Claims 13, 37, 50 and 52. Accordingly, it is not seen that *Chigier* teaches or suggests these invention of Claims 13, 37, 50 and 52.

Cohrs et al. may teach that a stream of feature vectors is processed by a conventional endpoint detector 42 which detector determines the beginning and end points of utterances embedded in the speech. As disclosed at lines 50-58 column 4 in *Cohrs et al.* feature vectors each of which "contains 10 to 30 components of speech features relating to speech energy, delta speech energy, cepstrum coefficients, and delta cepstrum coefficients. The stream of feature vectors is processed by conventional endpoint detector 42 which detector determines the beginning and end points of utterances embedded in the speech. The output of the endpoint detector comprises finite sequences of speech vectors, where each sequence of vectors corresponds to a single utterance." Accordingly, *Cohrs et al.* only uses a conventional endpoint detector that processes a stream of feature vectors and outputs speech vector sequences for single utterances. In contrast to *Cohrs et al.*, it is a feature of Claims 13, 37, 50 and 52 that the likelihoods of plural boundary locations are determined only within a generated energy signal indicative of local energy in a received signal and another feature that the likelihood determinations of the plural locations operates when speech is detected within the received signal. It is not seen that *Cohrs et al.* in any manner teaches or suggests these features of Claims 13, 37, 50 and 52.

With regard to the cited combination, it is not seen that the conventional endpoint detector of *Cohrs et al.* suggests the feature of determining boundary location from likelihoods of plural possible locations within an energy signal or that the probabilities determination of phoneme boundaries in *Chigiers* operates to determine the likelihoods of plural boundary locations when the speech is detected in the received signal. Accordingly, it is not seen that the addition of a conventional endpoint detector that processes streams of feature vectors rather than an energy signal generated by a received signal to the probabilities determination in *Chigiers* that does not operate to perform plural likelihood determinations at possible locations when speech is detected in the within the received signal could suggest the features of Claims 13, 37, 50 and 52.

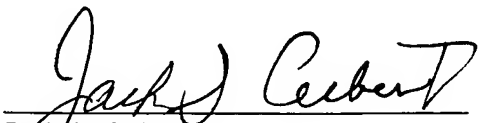
A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. These claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicants' attorney, Douglas W. Pinsky, may be reached in our Washington office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



Jack S. Cubert
Attorney for Applicants
Registration No. 24,245

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3800
Facsimile: (212) 218-2200
JSC/cmg

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